Junos Layer 2 VPNs (JL2V)

Duration: 3 Days Course Code: JUN_JL2V

Overview:

This three-day course is designed to provide students with the knowledge required to design, implement, and troubleshoot a wide variety of layer 2 MPLS VPNs, including pseudowires (BGP L2VPNs, LDP L2Circuits, FEC 129, and CCC), virtual private LAN service (VPLS), and Ethernet VPN (EVPN).

This course is based on Junos 21.2R1 and contains hands-on labs that gives extensive CLI configuration practice as well as many examples of common errors, and the troubleshooting steps required to fix them.
The Junos Layer 2 VPNs (JL2V) course is an intermediate-to-advanced level course.
Relevant Juniper Product
• MX Series

Target Audience:

• Individuals responsible for designing, implementing, and troubleshooting MPLS VPNs which operate at layer 2
• Individuals who work with, or who aspire to work with, service provider networks
• Individuals studying for the JNCIP-SP or JNCIE-SP certification exam

Objectives:

- After successfully completing this course, you should be able to:
- • Describe some of the different kinds of VPN, their mechanics, and their use cases
- • Discuss the types of MPLS VPN which operate at layer 2
- • Discuss the mechanics of BGP-signaled pseudowires, also known as a Layer 2 VPN (L2VPN)
- • Configure and troubleshoot BGP-signaled L2VPNs
- • Describe how and why L2VPNs advertise a range of labels
- • Configure advanced BGP-signaled L2VPN features
- • Discuss the mechanics of LDP-signaled pseudowires, also known as a Layer 2 Circuit (L2Circuit)
- • Identify and fix common L2Circuit problems
- • Configure advanced LDP-signaled L2Circuit features
- • Discuss the mechanics of FEC 129 pseudowires, which combines BGP for autodiscovery and LDP for signaling
- • Describe the purpose and mechanics of a VPLS
- • Configure and verify VPLS
- • Configure and verify different VPLS VLAN modes
- • Describe and configure VPLS advanced features, and VPLS troubleshooting
- • Configure advanced VPLS topologies
- • Describe the features and advantages of Ethernet VPN
- • Configure and verify single-homed EVPN instances
- • Explain, configure, and verify EVPN multihoming
- • Configure EVPN IRB interfaces, and other advanced EVPN concepts

Prerequisites:

The prerequisite skills for this course include:

• Strong general TCP/IP knowledge

• Junos knowledge to the JNCIA-Junos certification level

• LDP/RSVP and routing/switching knowledge to the JNCIS-SP certification level

The following courses should be completed before attending this course, or equivalent knowledge:

• Getting Started with Networking (eLearning)

• Introduction to the Junos Operating System (IJOS)

• Junos MPLS Fundamentals (JMF)

• Junos Intermediate Routing (JIR)

• Junos Enterprise Switching (JEX), Junos Service Provider Switching (JSPX), or both

Content:

Day 1

Course Introduction

Refresher: VPNs and MPLS

• IPsec VPNs and MPLS VPNs

• Layer 3 VPNs and layer 2 VPNs

The Different Flavors of Layer 2 VPN

• Discuss the function and creation of pseudowires

• Discuss the function and creation of VPLS

• Discuss the function and creation of EVPN

L2VPN aka BGP-Signaled Pseudowires

• Define some essential L2VPN terminology

• Explore the control plane and data plane of an L2VPN

• Observe an L2VPN packet capture

L2VPN Configuration and Troubleshooting

• Configure an L2VPN which accepts all Ethernet traffic

• Configure an L2VPN which accepts specific VLAN tags

• Troubleshoot common L2VPN problems

L2VPN—Site IDs, The Label Base, and Overprovisioning

• The Site ID and the VPN label

• Overprovisioned L2VPN configuration

• Configure and verify an L2Circuit

• Analyze a packet capture of an LDP advertisement

L2Circuit—Troubleshooting

• Configure the Pseudowire Status TLV

• Observe the most frequent L2Circuit error statuses

L2Circuit—Advanced Concepts

• Enable Virtual Circuit Connectivity Verification

• Configure multihoming, local switching, and interworking

Lab 3: LDP-Signaled L2Circuits

Day 2

FEC 129 Pseudowires

• Discuss the mechanics of FEC 129

• Configure and verify a FEC 129 pseudowire

Lab 4: FEC 129 Pseudowires (Optional)

Virtual Private LAN Service—Introduction

• Explain how VPLS forwards traffic between multiple sites

• Describe the three methods of signaling VPLS

VPLS—Configuration and Verification

• Configure a BGP-signaled VPLS

• Configure protection and MAC limiting in a VPLS

• Add IRB interfaces to VPLS instances, and configure efficient traffic flooding

• Describe VPLS-specific troubleshooting techniques

VPLS—Advanced Topologies

• Configure hub-and-spoke VPLS

• Configure multihomed sites in a VPLS

Lab 5: VPLS

Day 3

EVPN—Introduction

• Describe the advantages of EVPN over VPLS

• Explain the structure and purpose of EVPN route Type 2 and Type 3

EVPN—Single-Homed Configuration

• Configure and verify a VLAN-Based EVI

• Configure and verify a VLAN-aware bundle EVI 19 EVPN—Multihoming

• Describe Type 4 Ethernet Segment routes, and configure multihoming

• Describe Type 1 Ethernet Autodiscovery routes

EVPN—Advanced Concepts and Troubleshooting

• Configure and verify Automatic Gateway MAC-IP Synchronization

Lab 1: BGP-Signaled L2VPNs

L2VPN Advanced Concepts

• Configure and verify multihoming

• Explain Martini encapsulation and VLAN normalization

• Configure traffic policing, out-of-band route reflection, and route target constraint

Lab 2: L2VPNs—Advanced Concepts

L2Circuit, aka L2DP-Signalled Pseudowires

• Verify a BGP-signaled VPLS

• Configure and verify an LDP-signaled VPLS

• Configure and verify a FEC 129 VPLS

VPLS—The Four Modes of MAC Learning

• Configure and verify the default VLAN mode and VLAN-Aware mode

• Configure and verify VLAN-Normalizing mode and No-VLAN mode

• Configure and verify dual-stacked VLAN tags in VPLS

VPLS—Advanced Features and Troubleshooting

• Describe host routes in an L3VPN

• Configure alternative IRB methods

• Configure advanced EVPN features and mechanics

Lab: 6: EVPN

The following Appendices can be covered, if time permits, and are requested by the delegate/s prior to booking:

Appendix A: Inter-AS L2VPNs (Optional)

Appendix B: Circuit Cross-Connect (Optional)

Additional Information:

Delegates will receive an official set of e-kit courseware approximately 1 week prior to the start of the course.

Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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